

**IN THE UNITED STATES PATENT & TRADEMARK OFFICE**

Patent No. : 7,257,121  
Issued : August 14, 2007  
Title : SYSTEM AND METHOD FOR MAPPING QUALITY OF  
SERVICE LEVELS BETWEEN MPLS AND ATM  
CONNECTIONS IN A NETWORK ELEMENT  
Applicant : Timothy Harris Kuhl, et al.  
Application No. : 10/023,643  
Filed : December 21, 2001  
Confirmation No. : 6337  
Art Unit : 2616  
Examiner : Robert C. Scheibel  
Docket No. : 123081-339668  
Customer No. : 27,155

Commissioner of Patents  
Office of Patent Publication  
Attention: Certificates of Correction Branch  
P.O. Box 1450  
Alexandria, V.A. 22313-1450

**REQUEST FOR CERTIFICATE OF CORRECTION**

Sir:

The Applicant respectfully requests the issue of a Certificate of Correction for the above noted patent.

The requested corrections are as follows:

1. Specification, column 1, line 54: Insert a period after the word “element”.
2. Specification, column 2, line 2: Replace the word “an” with the word --a--.
3. Specification, column 6, line 41: Replace the word “act” with the word --art--.
4. Specification, column 7, line 18: Replace the word “unidirectional” with the word --uni-directional--.
5. Specification, column 7, line 48: Replace the word “unidirectional” with the word --uni-directional--.
6. Specification, column 8, line 31: Replace the word “MFLS” with the word --MPLS--.
7. Specification, column 8, line 33: Replace the word “ISP” with the word --LSP--.
8. Specification, column 9, line 9: Replace the number “658” with the number --358--.
9. Claim 4, column 13, line 44: Replace the word “conunication” with the word --communication--.
10. Claim 4, column 14, line 2: Replace the word “ration” with the word --ratio--.
11. Claim 6, column 14, line 32: Delete “wherein,” after “network,”.
12. Claim 8, column 14, line 53: Replace the word “mappig” with the word --mapping--.
13. Claim 8, column 14, line 57: Insert the word --into-- after the word “value”.
14. Claim 8, column 14, line 57: Replace the word “experimenmai” with the word --experimental--.
15. Claim 9, column 15, line 8: Replace the word “procedence” with the word --precedence--.
16. Claim 9, column 15, line 24: Delete the word “a”.
17. Claim 17, column 16, line 49: Replace the word “I” with the number --1--.

Please find enclosed a completed Form PTO/SB/44 ("Certificate of Correction") indicating the above corrections.

The errors for which corrections are requested were made by the Patent Office (i.e., items 4-7, 9-10, and 12-17 above) and by the Applicant (i.e., items 1-3, 8, and 11 above).

The above corrections are fully supported by the Applicant's specification as filed, by the "Examiner's Amendment" in the "Notice of Allowability" included with the "Notice of Allowance" mailed August 3, 2007, and by the Applicant's "Amendment/Reply" filed April 3, 2007. A copy of the Notice of Allowance and the Amendment/Reply are enclosed for reference.

The Commissioner is hereby authorized to charge all necessary fees and to credit Deposit Account No. 150633 in the name of McCarthy Tétrault LLP (Customer No. 27,155).

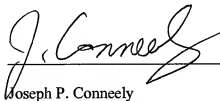
No new matter has been entered by the above corrections.

Respectfully submitted,

McCarthy Tétrault LLP

Date: October 5, 2007

By

A handwritten signature in black ink, appearing to read "J. Conneely", is written over a horizontal line.

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McCarthy Tétrault LLP  
Box 48, Suite 4700  
66 Wellington Street West  
Toronto Dominion Bank Tower  
Toronto, Ontario, Canada  
M5K 1E6

Enclosure(s)

## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 1 of 2

PATENT NO. : 7,257,121  
APPLICATION NO.: 10/023,643  
ISSUE DATE : AUGUST 14, 2007  
INVENTOR(S) : TIMOTHY HARRIS KUHL, ET AL.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

1. Specification, column 1, line 54: Insert a period after the word "element".
2. Specification, column 2, line 2: Replace the word "an" with the word --a--.
3. Specification, column 6, line 41: Replace the word "act" with the word --art--.
4. Specification, column 7, line 18: Replace the word "unidirectional" with the word --uni-directional--.
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7. Specification, column 8, line 33: Replace the word "ISP" with the word --LSP--.
8. Specification, column 9, line 9: Replace the number "658" with the number --358--.
9. Claim 4, column 13, line 44: Replace the word "conununication" with the word --communication--.

MAILING ADDRESS OF SENDER (Please do not use customer number below):

MCCARTHY TETRAULT LLP, BOX 48, SUITE 4700, 66 WELLINGTON STREET WEST, TORONTO,  
ONTARIO, CANADA M5K 1E6

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

Page 2 of 2

PATENT NO. : 7,257,121  
APPLICATION NO.: 10/023,643  
ISSUE DATE : AUGUST 14, 2007  
INVENTOR(S) : TIMOTHY HARRIS KUHL, ET AL.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

10. Claim 4, column 14, line 2: Replace the word "ration" with the word --ratio--.
11. Claim 6, column 14, line 32: Delete "wherein," after "network,".
12. Claim 8, column 14, line 53: Replace the word "mappig" with the word --mapping--.
13. Claim 8, column 14, line 57: Insert the word --into-- after the word "value".
14. Claim 8, column 14, line 57: Replace the word "experimenmai" with the word --experimental--.
15. Claim 9, column 15, line 8: Replace the word "procedence" with the word --precedence--.
16. Claim 9, column 15, line 24: Delete the word "a".
17. Claim 17, column 16, line 49: Replace the word "I" with the number --1--.

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This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 10 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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## UNITED STATES PATENT AND TRADEMARK OFFICE

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**RECEIVED**  
**McCarthy Tétrault LLP**

MAY 10 2007

## NOTICE OF ALLOWANCE AND FEE(S) DUE

27155 7590 05/03/2007

MCCARTHY TETRAULT LLP  
 BOX 48, SUITE 4700,  
 66WELLINGTON STREET WEST  
 TORONTO, ON M5K 1E6  
 CANADA

**EXAMINER**

SCHIBEL, ROBERT C

ART UNIT

PAPER NUMBER

2616

DATE MAILED: 05/03/2007

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/023,643

12/21/2001

Timothy Harris Kuhl

123081-339668

6337

TITLE OF INVENTION: SYSTEM AND METHOD FOR MAPPING QUALITY OF SERVICE LEVELS BETWEEN MPLS AND ATM CONNECTIONS IN A NETWORK ELEMENT

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1400	\$300	\$0	\$1700	08/03/2007

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

## HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER:** Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

### Notice of Allowability

Application No.

10/023,643

Examiner

Robert C. Scheibel

Applicant(s)

KUHL ET AL.

Art Unit

2616

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment filed 4/3/2007.
2. ☒ The allowed claim(s) is/are 1,10-12,19,22-25 and 28-36, renumbered 1-18.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

#### Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 20070423.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Joseph P. Conneely (Reg. No. 54,883) on April 26, 2007.

The application has been amended as follows:

In claim 24, line 6, the phrase "mapping said MPLS class of service value to an experimental field value" has been corrected to -- mapping said MPLS class of service value and a drop precedence of said at least on ATM cell to an experimental field value --.

In claim 24, lines 12-13, the phrase "wherein said QoS parameter indicates drop precedence for the at least one ATM cell and the experimental field value" has been corrected to -- wherein said experimental field value --.

In claim 24, line 16, the phrase "said QoS parameter" has been corrected to -- said ATM QoS parameter --.

In claim 25, line 5, the phrase "mapping said MPLS class of service value to an experimental field value" has been corrected to -- mapping said MPLS class of service value and a drop precedence of said at least on ATM cell to an experimental field value --.



Art Unit: 2616

In claim 25, lines 16-17, the phrase "said QoS parameter indicates drop precedence for the at least one ATM cell and the experimental field value" has been corrected to -- said experimental field value --.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert C. Scheibel whose telephone number is 571-272-3169. The examiner can normally be reached on Monday and Thursday from 7:00-5:30 Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema S. Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*RC* 4-26-07  
Robert C. Scheibel  
Patent Examiner  
Art Unit 2616

*Seema S. Rao*  
4/30/07  
SUPERVISOR  
TECHNICAL STAFF

**IN THE UNITED STATES PATENT & TRADEMARK OFFICE**

Appl. No. : 10/023,643  
Applicant : Timothy Harris Kuhl  
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Title : SYSTEM AND METHOD FOR MAPPING QUALITY OF  
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Docket No. : 123081-339668  
Customer No. : 27,155

Commissioner of Patents  
P.O. Box 1450  
Alexandria, V.A. 22313-1450

**AMENDMENT/REPLY**

Sir:

This is in response to the Examiner's Office Action mailed January 3, 2007.

Please amend the above-identified application as follows:

**Amendments to the Claims** are reflected in the listing of claims which begins on page 2 of this paper; and,

**Remarks/Arguments** begin on page 11 of this paper.

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**LISTING OF CLAIMS:**

1. (Currently Amended) A method for of translating at least one ATM quality of service (QoS) parameter related to an ATM transmission protocol from said ATM transmission protocol to a MPLS transmission protocol for an ATM cell being sent on a connection from an ATM communication network utilizing said ATM transmission protocol to a MPLS communication network utilizing said MPLS transmission protocol, said method comprising:

mapping said at least one ATM QoS parameter to a MPLS class of service value for said connection;

mapping said MPLS class of service value and a drop precedence value of said ATM cell the data element to an experimental field value for another parameter indicating a MPLS quality of service provisioning ~~for said MPLS transmission protocol~~ ;

converting said ATM cell of ~~said connection~~ to a MPLS frame ~~associated with said MPLS transmission protocol~~ ; and   

incorporating said experimental field value ~~another parameter~~ into said MPLS frame for transmission of ~~said MPLS frame in~~ through the MPLS network ~~with the MPLS transmission protocol~~ ;   

wherein:

said at least one ATM QoS parameter further includes ~~a priority rating for MPLS frame and~~ at least one of an ATM service category, a cell loss ratio    and a cell delay variation;

said experimental field value ~~another parameter~~ indicates drop precedence for said MPLS frame in addition to said MPLS class of service value ~~in said MPLS communication network~~ ; and

said MPLS frame is provided to said MPLS network for transmission through a label switched path and said another parameter is inserted in an experimental field of said MPLS frame

said MPLS class of service value is one of a number of MPLS class of service values, said drop precedence value is one of first and second drop precedence values, said experimental field value is one of a number of experimental field values, and each of said MPLS class of service values is assigned first and second experimental field values selected from said number of experimental field values, said first and second experimental field values being associated with said first and second drop precedence values, respectively .

2-9. (Cancelled)

10. (Currently Amended) The -A- method of translating at least one QoS parameter as claimed in claim 1, wherein said MPLS frame is transmitted through a label switched path of said MPLS network, wherein said label switched path is an experimental inferred per hop behaviour label switched path (E-LSP) , wherein said number of MPLS class of service values is eight, wherein said number of experimental field values is eight, and wherein said first and second experimental field values are selected from first and second groups of four of said eight experimental field values, respectively .

11. (Currently Amended) The -A- method of translating at least one QoS parameter as claimed in claim 1, wherein said label switched path is a label inferred per hop behaviour label switched path (L-LSP) , wherein said number of MPLS class of service values is eight, and wherein said number of experimental field values is two .

12. (Currently Amended) A translation module for of a network element, said translation module translating at least one ATM quality of service (QoS) parameter related to an ATM transmission protocol from said ATM transmission protocol to a MPLS transmission protocol for an ATM cell being sent on a connection from an ATM communication network utilizing said ATM transmission

protocol to a MPLS communication network utilizing said MPLS transmission protocol, said network element connected to said ATM communication network and said MPLS communication network, said network element receiving said ATM cell from said ATM communication network and communicating said ATM cell to said translation module, said network element transmitting said ATM cell from said network element over said MPLS communication network after translation of said at least one ATM QoS parameter, said translation module comprising:

a control complex providing management for said network element, said control complex containing a first sub-module for mapping said at least one ATM QoS parameter to a MPLS class of service value for said connection;

a MPLS card connected to said control complex, the MPLS card containing:

a second sub-module for mapping said MPLS class of service value and a drop precedence value of the ATM cell to an experimental field value for another transmission parameter indicating a MPLS quality of service provisioning for said MPLS transmission protocol;

a conversion sub-module, said conversion sub-module:

for converting said ATM cell of said connection to a MPLS frame associated with said MPLS transmission protocol; and, and for

incorporating said experimental field value another transmission parameter into said MPLS frame for transmission of said MPLS frame in through the MPLS network with the MPLS transmission protocol;

wherein:

said at least one ATM QoS parameter further includes a priority rating for said ATM cell and at least one of an ATM service category, a cell loss ratio, and a cell delay variation;

said experimental field value another transmission parameter indicates drop precedence for said MPLS frame in addition to said MPLS class of service value in said MPLS communication network; and

said MPLS class of service value is one of a number of MPLS class of service values, said drop precedence value is one of first and second drop precedence values, said experimental field value is one of a number of experimental field values, and each of said MPLS class of service values is assigned first and second

experimental field values selected from said number of experimental field values, said first and second experimental field values being associated with said first and second drop precedence values, respectively

said network element includes an ATM card, said ATM card providing an interface for said ATM network, said ATM card receiving said ATM cell from said ATM network and communicating said one ATM cell to said translation module, said ATM card is a line card, said MPLS card is a line card, said MPLS card providing an interface for said MPLS network and said MPLS card transmitting said MPLS frame over said MPLS network .

13-18. (Cancelled)

19. (Currently Amended) The -A- translation module of a network element as claimed in claim 12, wherein said network element includes an ATM card, said ATM card providing an interface for said ATM network, said ATM card receiving said ATM cell from said ATM network and communicating said ATM cell to said translation module, said ATM card is a line card, said MPLS card is a line card, said MPLS card providing an interface for said MPLS network and said MPLS card transmitting said MPLS frame over said MPLS network ~~said network element transmits said MPLS frame over said MPLS network through a label switched path and said another transmission parameter is inserted in an experimental field of said MPLS frame .~~

20-21. (Cancelled)

22. (Currently Amended) The -A- translation module of a network element as claimed in claim 12 19 , wherein said MPLS frame is transmitted through a label switched path of said MPLS network, wherein wherein said label switched path is an experimental inferred per hop behaviour label switched path (E-LSP) , wherein said number of MPLS class of service values is eight, wherein said number of experimental field values is eight, and wherein said first and second experimental field values are selected from first and second groups of four of said eight experimental field values, respectively .

23. (Currently Amended) ~~The -A- translation module of a network element as claimed in claim 12~~  
~~19~~ , wherein said label switched path is a label inferred per hop behaviour label switched path (L-  
LSP) , wherein said number of MPLS class of service values is eight, and wherein said number of  
experimental field values is two .

24. (Currently Amended) A method for ~~of~~ formatting a MPLS frame ~~packet~~ to support ~~-a-~~ an ATM  
quality of service (QoS) parameter related to at least one ATM cell when said MPLS frame ~~packet~~ is  
transmitted on a MPLS communication network, said method comprising:

mapping said ATM QoS parameter to a MPLS class of service value for a MPLS connection  
for said MPLS frame ~~packet~~ ;

mapping said MPLS class of service value to an experimental field value for another  
parameter indicating a MPLS quality of service provisioning ~~for said MPLS communication~~  
~~network~~ ;

inserting said experimental field value ~~class of service value~~ into ~~-a-~~ an experimental field  
of a header of said MPLS frame ~~packet~~ ; and

inserting contents of said ATM cell in said MPLS frame ~~packet~~ ,

wherein said QoS parameter indicates drop precedence for the at least one ATM cell and the  
experimental field value ~~another parameter~~ further indicates drop precedence for said MPLS  
frame ~~second data element in said MPLS communication network~~ , said drop precedence of  
said at least one ATM cell utilizes a value of drop precedence for each of said at least one  
ATM cell, and said QoS parameter further ~~includes a priority rating for the at least one ATM~~  
~~cell and at least one of~~ ~~-a-~~ an ATM service category, a cell loss ratio and a cell delay  
variation.

25. (Currently Amended) A method for ~~of~~ routing at least one ATM cell through a MPLS network,  
said method comprising:

mapping ~~-a-~~ an ATM quality of service (QoS) parameter related to the at least one ATM cell  
to a MPLS class of service value for a MPLS connection for said MPLS network;

mapping said MPLS class of service value to an experimental field value for another  
parameter indicating a MPLS quality of service provisioning for said MPLS communication  
network ;

creating a MPLS frame packet ;  
 inserting said experimental field value ~~class of service value into a~~ an experimental field of a header of said MPLS frame packet ;  
 inserting contents of said at least one ATM cell in said MPLS frame packet ;  
 routing said MPLS frame packet through one or more routers ~~router~~ in said MPLS ~~communication network~~ according to contents of said experimental field value ~~another parameter~~ ;  
 wherein :

said ATM QoS parameter indicates drop precedence for the at least one ATM cell and the experimental field value ~~another parameter~~ further indicates drop precedence for said MPLS frame ~~second data element in said MPLS network~~ , said drop precedence of said at least one ATM cell utilizes a value of drop precedence for each of said at least one ATM cell, and said ATM QoS parameter further includes a ~~priority rating for the at least one ATM cell and at least one of a~~ an ATM service category, a cell loss ratio, and a cell delay variation; and a  
 said experimental field value ~~specifies contents of said another parameter specify~~ experimental (EXP) inferred label switched path scheduling treatment and drop precedence treatment.

26-27. (Cancelled)

28. (Currently Amended) A method for ~~of~~ transporting data traffic of a first transmission protocol through an MPLS network from an edge network element connected to an ingress point of the MPLS network to an egress point of the MPLS network, while maintaining a quality of service (QoS) of the data traffic, the method comprising:

providing a first mapping table with correspondence between a plurality of QoS parameters relating to the data traffic arriving at the edge network element and a plurality of classes of service for MPLS frames generated from the data traffic at said edge network element ~~device~~ for transmission through the MPLS network, each one of the plurality of classes of service for maintaining a QoS of its corresponding QoS parameter in the MPLS network;



identifying a QoS parameter of a data element of the data traffic arriving at the edge device over a connection and encapsulating content from the data element into a MPLS frame;

consulting the first mapping table to identify one class of the plurality of classes of service corresponding to the QoS parameter of the data ~~packet~~ and element;

consulting a second mapping table to identify a label field value associated with the one class of service and with a drop precedence value for the data element;

inserting the label field value ~~a class of service identifier associated with the one class~~ into an unused field of an the outer label of the MPLS frame carrying the data element; and

transporting the MPLS frame across the MPLS network, the MPLS frame identifying the one class of service and the drop precedence value for of the data element ~~in the MPLS frame~~ to maintain the QoS ~~QoS~~ of the data traffic.

29. (Currently Amended) The method of claim 28, wherein the unused field is ~~the~~ an EXP field of the MPLS frame.

30. (Currently Amended) The method of claim 29, wherein the first transmission protocol is ATM [,]  
and the data element is an ATM cell ~~, and the QoS parameter includes a drop precedence parameter taken from a CLP bit of the ATM cell~~.

31. (Currently Amended) The method of claim 30, wherein the QoS parameter provides ~~includes~~ a scheduling priority ~~parameter~~ for the ATM cell.

32. (Currently Amended) The method of claim 31, wherein the ATM cell arrives at the edge network element in an ATM connection, and the QoS ~~QoS~~ parameter identifies: a service category for the ATM connection; a cell loss ratio (CLR) for the ATM connection; and a cell delay variation (CDV) for the ATM connection.

33. (Currently Amended) The method of claim 32, wherein for the first mapping table, each of the plurality of QoS parameters defines properties relating to at least one of an ATM service category, a CLR and a CDV.

34. (Currently Amended) The method of claim 33, wherein each of the plurality of classes of service for MPLS frames is one of eight classes, and the first mapping table defines a correspondence between:

a first class to: the properties including an ATM service category of constant bit rate (CBR); or     the properties including an ATM service category of real-time variable bit rate (rtVBR) and  $250\mu s \leq CDV < 2,500\mu s$ ;

a second class to the properties including an ATM service category of real-time variable bit rate (rtVBR) and  $2,500\mu s \leq CDV < 10,000\mu s$ ;

a third class to the properties including an ATM service category of non-real-time variable bit rate (nrtVBR) and a CLR of  $10^{-7}$ ;

a fourth class to the properties including an ATM service category of non-real-time variable bit rate (nrtVBR) and a CLR of  $10^{-6}$ ;

a fifth class to the properties including an ATM service category of non-real-time variable bit rate (nrtVBR) and a CLR of  $10^{-5}$ ;

a sixth class to the properties including an ATM service category of non-real-time variable bit rate (nrtVBR) and a CLR of  $10^{-1}$  to  $10^{-4}$ ;

a seventh class to the properties including an ATM service category of available bit rate (ABR); and

an eighth class to the properties including an ATM service category of unspecified bit rate (UBR), a CLR of any value, and a CDV of any value.

35. (Currently Amended) The method of claim 34, wherein the drop precedence value is derived from QoS parameter includes a cell loss priority (CLP) bit of the data element, and:

if the CLP bit is 0 and if the MPLS frame is transported over a label inferred per hop behaviour label switched path (L-LSP), then the label field value has class-of-service identifier includes a value of "1" inserted into the EXP field of the MPLS frame; and \_

if the CLP bit is 1 and if the MPLS frame is transported over a label inferred per hop behaviour label switched path (L-LSP), then the label field value has class-of-service identifier includes a value of "2" inserted into the EXP field of the MPLS frame.

36. (Currently Amended) A method for of translating at least one quality of service (QoS) parameter related to a first cell-based transmission protocol from said first cell-based transmission protocol to a second transmission protocol for a data element being sent on a connection from a first a first cell-based communication network utilizing said first transmission protocol to a second communication network utilizing said second transmission protocol, said method comprising:

mapping said at least one QoS parameter to a class of service value for said connection;  
mapping said class of service value and a drop precedence value of the data element to a label field value ~~another parameter~~ indicating a quality of service provisioning for said second transmission protocol;

converting said data element of said connection to a second data element associated with said second transmission protocol; and \_

incorporating said label field value ~~another parameter~~ into said second data element for transmission of said second data element in the second network with the second transmission protocol \_

wherein said class of service value is one of a number of class of service values, said drop precedence value is one of first and second drop precedence values, said label field value is one of a number of label field values, and each of said class of service values is assigned first and second label field values selected from said number of label field values, said first and second label field values being associated with said first and second drop precedence values, respectively .

**REMARKS/ARGUMENTS**

Claim 1 is objected to for including an informality. The Examiner suggests that the phrase “the data element” in line 8 be amended to recite “the ATM cell”. Claim 1 has been amended to recite “said ATM cell”.

Claim 24 is objected to for including an informality. The Examiner suggests that the phrase “the second data element” in line 12 be amended to recite “the MPLS packet”. Claim 24 has been amended to recite “said MPLS frame”.

Claim 25 is objected to for including an informality. The Examiner suggests that the phrase “the second data element” in line 14 be amended to recite “the MPLS packet”. Claim 25 has been amended to recite “said MPLS frame”.

Claims 1, 10-12, 19, 22-25, and 36 stand rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent Application Publication No. 2003/0039246 by Guo, et al. (“Guo”) in view of United States Patent Application Publication No. 2003/0169751 by Pulkka, et al. (“Pulkka”). In addition, Claims 28-29 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Guo. Furthermore, Claims 30-31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Guo in view of Pulkka. Moreover, Claim 32-33 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Guo in view of Pulkka and further in view of United States Patent Application Publication No. 2002/0093980 by Trebes, Jr. (“Trebes”).

The Examiner has objected to Claims 34-35 as being dependent upon a rejected base claim, but would allow these claims if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The Applicant thanks the Examiner accordingly.

Note that in rejecting Claims 25, 36, and 28 on pages 6, 8, and 10, respectively, of the Office Action the Examiner mentions “Chen”. The Applicant assumes that the reference to Chen should have been to Guo.

Claims 1, 10-12, 19, 22-25, and 28-36 have been amended with a view to better defining the invention. No new matter has been entered by these amendments. Consequently, the Examiner is respectfully requested to consider amended claims in view of the following comments.

For reference, amended Claim 1 recites the following:

1. (Currently Amended) A method for translating at least one ATM quality of service (QoS) parameter related to an ATM transmission protocol from said ATM transmission protocol to a MPLS transmission protocol for an ATM cell being sent on a connection from an ATM communication network utilizing said ATM transmission protocol to a MPLS communication network utilizing said MPLS transmission protocol, said method comprising:

mapping said at least one ATM QoS parameter to a MPLS class of service value for said connection;

mapping said MPLS class of service value and a drop precedence value of said ATM cell to an experimental field value for indicating a MPLS quality of service provisioning;

converting said ATM cell to a MPLS frame; and,

incorporating said experimental field value into said MPLS frame for transmission through the MPLS network;

wherein:

said at least one ATM QoS parameter includes at least one of an ATM service category, a cell loss ratio, and a cell delay variation;

said experimental field value indicates drop precedence for said MPLS frame in addition to said MPLS class of service value; and,

said MPLS class of service value is one of a number of MPLS class of service values, said drop precedence value is one of first and second drop precedence values, said experimental field value is one of a number of experimental field values, and each of said MPLS class of service values is assigned first and second experimental field values selected from said number of experimental field values, said first and second experimental field values being associated with said first and second drop precedence values, respectively.

The Examiner has cited Guo against previous Claim 1. In particular, on pages 4-5 of the Office Action the Examiner states:

"Regarding claims 1 and 12, Guo discloses a method of translating at least one quality of service (QoS) parameter (the many QoS parameters/requirements of traffic carried in the 3G-RAN described in paragraph 40 on page 4 of Guo) related to a first transmission protocol (the radio protocols used by the BSs and RNCs of figure 4) from said transmission protocol to a MPLS transmission protocol for a data element (radio network packets sent through the MPLS network 406) being sent on a connection from a communication network (radio network) to a MPLS communication network (MPLS switching network 406 of Figure 4) utilizing said MPLS transmission protocol, said method comprising: mapping said at least one QoS parameter (the many QoS parameters/requirements of traffic carried in the 3G-RAN described in paragraph 40 on page 4 of Guo) to a class of service value for said connection (the classes of services are the traffic classes of the radio network controller and/or base station – see lines 8-10 of paragraph 33 on page 3, for example; clearly the mapping between the QoS parameters of paragraph 40 occurs in order to quantify a number of traffic classes); mapping said class of service value and a drop procedure value of the data element to another parameter (the EXP field of the MPLS packet; see paragraph 34 of page 3 which clearly indicates that the EXP field value includes information on both the QoS class as well as the drop precedence; clearly, the drop precedence is used to determine the value to which the EXP field is to be set) indicating a quality of service provisioning for said MPLS transmission protocol (see paragraph 34 on page 3 as described above); converting said data element of said connection to a MPLS frame associated with said second MPLS transmission protocol (see lines 8-12 of paragraph 38 on page 4 of Guo); and incorporating said another parameter into said MPLS frame for transmission of said MPLS frame in the MPLS network with the second MPLS transmission protocol (again, see paragraph 34 on page 3 which indicates the use of the EXP field) wherein: said at least one QoS parameter further includes a priority rating (see lines 7-9 of paragraph 44 on page 4) for MPLS frame and at least one of service category, cell loss ratio and cell delay variation (the UMTS traffic classes of paragraph 40 on page 4 are the scheduling classes); said another parameter indicates drop precedence for said MPLS frame in said MPLS communication network (see paragraph 34 on page 3 which describes how the drop precedence is included in the EXP field); and said MPLS frame is provided to said MPLS network for transmission through, a

label switched path and said another parameter is inserted in an experimental field of said MPLS frame (see figures 4 and 5 as well as lines 8-12 of paragraph 38 on page 4 of Guo)."

For reference, the selections from Guo cited by the Examiner above are as follows (context and underlining added by the Applicant):

"[0033] The following description of MPLS network principles and operation is provided to understand the implementation of the present invention in the MPLS environment in a radio access network. The focus of QoS support in MPLS networks is scalability. This is achieved by flow aggregation that ensures individual end-to-end QoS guarantees without maintaining state information about individual flows on each segment of the path. This satisfies the requirement to provide differentiated QoS to multiple classes of traffic in the RAN. Diffserv mechanisms are good candidates to provide QoS within MPLS networks because services are based on a per-hop model and aggregate forwarding resources that are allocated in the LSRs for each service. Functions such as classification, marking and policing are only necessary at the edge LSRs, while core LSRs need only have PHB classification. There are two types of LSPs, the E-LSPs and the L-LSPs."

"[0034] The general operation of DiffServ in an E-LSPs based MPLS domain is analogous to DiffServ in a non-MPLS network in the sense that the Per-Hop Behavior of the packet is based entirely on the encoded EXP field. In other words, instead of setting/reading DiffServ code point from the TOS field in IP header, it is set/read from the EXP field in the MPLS header. The EXP field is only 3-bits long and therefore a single E-LSP can support only up to 8 QoS classes. The mapping from EXP field to PHB (i.e. to PSC and drop precedence) for a given such LSP, is either explicitly signaled at label set-up or in reliance on a pre-configured mapping. The signaling can also be used to make bandwidth reservations for the E-LSP. One drawback of E-LSPs is that it can support only 2 QoS classes in the ATM domain, because the QoS treatment can be coded only in the Cell Loss Priority (CLP) bit in the ATM header."

"[0038] Referring now to FIG. 4, in one embodiment of the present invention UTRAN transport is implemented using label switching in a network supporting MPLS. This is in contrast to the scheme in which the UTRAN transport is provided by normal IP packet

forwarding. In other words, 'paths' 400 are established to interconnect BS 402 and RNC 404. Such 'paths' 400 in an MPLS network 406 are the label switched paths (LSPs). After the LSP setup, the packets carrying radio frames are labeled at the ingress of the network and forwarded along the path using label switching. The advantage of this concept is that it can support built-in QoS."

"[0040] For illustration purposes, the following describes the downlink direction (uplink works in a similar way). For each BS 402 at least one LSP 400 is set up for carrying the aggregated traffic of the BS 402. In 3G-RAN the traffic of a BS 402 is likely to comprise multiple classes, with different transport requirements. An example of that is UMTS traffic classes, i.e. conversational, streaming, interactive and background. Another example is the transport channels on WCDMA air interface which support soft-handover (e.g. dedicated channels, or DCH), and those which do not support soft handover (e.g. some common channels, or CCH). Yet another example is the transport channels, which require closed-loop power control (e.g. Dedicated Channels, Downlink Shared Channels, or DSCH, and Common Packet Channel, or CPCH) and those which do not require closed-loop power control (e.g. Forward Access Channel, or FACH, and Random Access Channel, or RACH). The diverse QoS requirements of the applications themselves (such as real time or non real time) combined with the requirements imposed by advanced radio control functions (such as soft handover and power control in CDMA systems) means that the MPLS transport technology needs to provide differentiated quality of services to multiple classes of traffic."

"[0044] In another embodiment multiple LSPs (see paths 506, 508, 510 in FIG. 5) are set up to connect each BS to the RNC, each LSP carrying one class of traffic, i.e. LSPs are class-specific. At the ingress of the MPLS transport network, the packets are mapped onto different LSPs based on their traffic classes. QoS differentiation is not required within the LSPs. The LSPs for different traffic classes will be assigned different attributes, such as bandwidth, priority, adaptability and so on. This embodiment can be implemented based on the L-LSP scheme and allows finer granularity resource control than the one with single LSP per BS. It allocates bandwidth resources in the transport network on a per class basis."



Please consider the following additional selections from Guo:

“[0001] The present invention provides a transport scheme based on Internet protocol (IP) and multiprotocol label switching (MPLS) technology for third generation (3G) radio access networks (RAN). Label switched paths are established and managed for interconnecting base stations and radio network controllers.”

“[0011] It is a drawback of prior art systems that these systems cannot handle the diverse QoS requirements of the applications themselves (such as real time or non real time) when combined with the requirements imposed by advanced radio control functions (such as soft handover and power control in CDMA systems). The prior art systems do not adequately provide the transport technologies that can provide differentiated quality of services to multiple classes of traffic. The transport bearers need to support a variety of QoS requirements (delay, jitter, packet loss, etc.) and traffic characteristics (streaming, bursty, etc.). Other transport requirements, which are not adequately provided by the prior art include efficiency (i.e. reduction in protocol overhead), in-sequence packet delivery and connection identification of the air interface channels. While ATM/AAL2 transport scheme can support QoS requirements in UTRAN, it requires deployment of ATM switches and other equipment in both BSs and RNCs. This may not be the preferred solution for many 3G operators, who have a strong interest in fast and reliable transport technology for 3G radio access networks, without having to deploy ATM equipment. While ATM/AAL2 transport scheme can support QoS requirements in UTRAN, it requires deployment of ATM switches and other equipment in both BSs and RNCs. This may not be the preferred solution for many 3G operators, who require fast and reliable transport technology for 3G radio access networks, without having to deploy ATM equipment.”

“[0035] The L-LSPs are used when more than 8 QoS classes (or more than 2 QoS classes with ATM) have to be supported. With L-LSPs this is accomplished by establishing a separate LSP for each QoS class between two MPLS capable neighbor nodes. In this approach the QoS treatment of the packet is not based only on the EXP field in the MPLS header (there is not an EXP-field with ATM nodes), but on incoming label plus some other information either in the MPLS header or in the data link layer header. For

example, with ATM, the QoS class is coded in the VPI/VCI field plus in the CLP bit. In order for the receiving node to know which QoS class the received packet belongs to, this information has to be signaled between nodes. This is accomplished by using either LDP or RSVP. Thus, in addition to the label, the LDP/RSVP message has been extended to contain information of QoS treatment of the packet marked with a particular label. The receiving node has to store this information in order to guarantee proper treatment of the labeled packet.”

“[0041] There are two approaches to provide differentiated QoS in an MPLS-based transport network for 3G-RANs (see FIG. 5). The first one is to use a single LSP 500 to connect each BS 502 to the RNC 504. Multiple classes of traffic of a BS 502 are carried within one LSP 500. QoS differentiation is provided by packet marking and per-hop behavior (PHB) forwarding based on the CoS field of the header. The second one is to use multiple LSPs 506, 508, 510 to connect each BS 502 to the RNC 504. Each LSP 506, 508, 510 carries one class of traffic, i.e. class-based LSPs. In order to meet the transport QoS requirements of 3G-RAN, one embodiment of the present invention implements constraint-based routing to compute routes for LSPs. As mentioned earlier, an LSP can be assigned one or more attributes, such as bandwidth, set-up priority, holding priority and so on. In the simplest case, constraint-based routing computes LSP paths subject to bandwidth constraints alone. The basic rule is that the paths are selected such that the sum of bandwidths of all the LSPs on a link is less than the maximum reservable bandwidth of that link.”

“[0043] In one embodiment a single LSP (see path 500 in FIG. 5) is set up to connect each BS to the RNC. The aggregated traffic of a BS, including all the classes, is carried within one LSP. At the ingress LSR of the LSPs the CoS field of the MPLS header is marked based on the traffic classes. Packets are buffered and scheduled based on the CoS field of the header in all the routers along the LSP. This embodiment can be implemented based on the E-LSP scheme and allocates bandwidth resources in the transport network on a per BS basis. It requires fewer LSPs than the one with multiple LSPs for each BS. In addition, it offers more flexibility in inter-class resource sharing. Sharing the allocated bandwidth between different traffic classes within a BS can be based on the DiffServ policy implemented at the LSRs.”

"[0053] FIG. 10 depicts an embodiment of the inventive method of providing differentiated QoS in an MPLS based transport network for 3G-RAN. In step 1000 single or multiple first label switching paths are established having at least one label switching router, the first label switching path connecting a base station to a radio network controller, the base station having a plurality of traffic classes of traffic. In step 1002 single or multiple second label switching paths are established having at least one label switching router, the second label switching path connecting the radio network controller to the base station, the radio network controller having a plurality of traffic classes of traffic. In step 1004 a CoS field of a MPLS header is marked at a label switch router at an ingress to a respective label switching path of the first and second label switching paths to identify respective traffic classes of traffic being carried by a respective one of the base station and radio network controller. In step 1006 the traffic within the respective label switching path is forwarded through the network based on the marked CoS field."

First, it is apparent from the above selections that Guo does not teach mapping both MPLS class of service and drop precedence (i.e., CLP) information to the MPLS experimental field as recited in amended Claim 1. That is, Guo does not teach a double or two stage mapping. In this respect, the Examiner is directed to paragraph 0035 of Guo (quoted above) which describes the problem that the Applicant's invention actually solves. Guo's singular mapping is apparent from paragraph 0053. Guo's method does not include drop precedence information in the experimental field.

Second, it is apparent from paragraph 0035 of Guo that Guo teaches away from the method of the Applicant's invention as recited in amended Claim 1. In particular, Guo describes an alternate method of relaying both MPLS class of service and drop precedence information that does not make sole use of the MPLS experimental field (i.e., by using the LDP or RSVP protocols).

Third, Guo pertains to IP packets and MPLS frames (see paragraph 0001 of Guo) rather than to ATM cells and MPLS frames. As such, Guo is not relevant to the subject matter recited in amended Claim 1.

As such, Guo does not teach or suggest those elements of amended Claim 1 that recite: “wherein:...said experimental field value indicates drop precedence for said MPLS frame in addition to said MPLS class of service value; and, said MPLS class of service value is one of a number of MPLS class of service values, said drop precedence value is one of first and second drop precedence values, said experimental field value is one of a number of experimental field values, and each of said MPLS class of service values is assigned first and second experimental field values selected from said number of experimental field values, said first and second experimental field values being associated with said first and second drop precedence values, respectively”.

As such, the Applicant believes that amended Claim 1 is patentable over Guo as this reference does not teach or suggest the subject matter of amended Claim 1. In addition, the Applicant believes that Claims 10-11, being dependent on amended Claim 1 and adding patentable features thereto, are also patentable.

For the reasons given above with respect to amended Claim 1, the Applicant believes that amended Claim 12 is patentable. In addition, the Applicant believes that Claims 19 and 22-23, being dependent on amended Claim 12, and adding patentable features thereto, are also patentable.

For the reasons given above with respect to amended Claim 1, the Applicant believes that amended Claim 28 is patentable. In addition, the Applicant believes that Claims 29-35, being dependent on amended Claim 28, and adding patentable features thereto, are also patentable.

For the reasons given above with respect to amended Claim 1, the Applicant believes that amended Claims 24-25 and 36 are patentable.

No new matter has been entered by the above noted amendments.

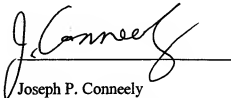
The Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

McCarthy Tétrault LLP

Date: April 3, 2007

By

A handwritten signature in black ink, appearing to read "J. Conneely", is written over a horizontal line.

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